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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,146	04/01/2004	Se-Wan Kim	0630-1988PUS1	7347

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EXAMINER
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OLSEN, LIN B

ART UNIT	PAPER NUMBER
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3661

NOTIFICATION DATE	DELIVERY MODE
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ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/814,146	<b>Applicant(s)</b> KIM, SE-WAN	
	<b>Examiner</b> LIN B. OLSEN	<b>Art Unit</b> 3661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-6 and 8-18 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1,2,4-6,8,12-14 and 16-18 is/are rejected.
- 7) ☐ Claim(s) 9-11, 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

## **DETAILED ACTION**

### ***Response to Arguments***

In light of the amendments made, the objections to claims 1, 7 and 9 have been withdrawn.

The provisional obviousness-type double patenting rejection has been converted into an obviousness-type double patenting rejection due to the issuance of Patent application 10/743,493 as U.S. Patent No. 7,328,068.

Applicant's arguments with respect to the rejection of claim 1 under Kim et al. have been considered and are persuasive. This rejection of claim 1 has been withdrawn.

Applicant's arguments with respect to claims 1-2, have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments filed December 20, 2007 with respect to the rejection of claims under U.S.C. 103(a) over De Bruyne in view of Passey have been fully considered but they are not persuasive. Both the RF signal and ultrasonic signals in Passey are triggered by the same pulse generator. Therefore, "the ultrasound signals [are] generated based on a point of time at which a radio frequency (RF) signal is emitted". Further, since the RF signal is emitted at preset time intervals the ultrasound signals are generated at the preset time intervals. Therefore, when Passey's RF transmitter is combined with De Bruyne's configuration, the preset time intervals of RF and ultrasonic signals meet the claim limitations of claims 1 and 16.

### ***Claim Objections***

**Claim 18** objected to because of the following informalities: On line 10, the claim is ambiguous as to whether there are one or more ultrasonic signal reception units because no article is used. On lines 17 and 19 the examiner presumes “ultrasonic signal reception units” is meant to be used. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**Claim 4 and 16** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites “for discriminating a position of at least one ultrasonic reception unit”. The examiner does not understand how to discriminate among one item. Further at page 14, line 17 there is support for no fewer than two or more ultrasonic reception units when the units are numbered.

**Claims 8, 17 and 18** are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: At page 6 line 24 and page 7 line 3 the ultrasonic signal oscillating units are described as oscillated sequentially after the RF signal is received by the RF reception unit, whereas the claims

recites "the ultrasonic signals are oscillated whenever the RF signal is received by the reception unit".

**Claim 1** recites the limitation "the ultrasound signal" in lines 4 and 12 of the amended claim. There is insufficient antecedent basis for this limitation in the claim. There is however antecedent basis for "each ultrasound signal".

**Claim 12 and 14 depend** on claim 8 which recites the limitation "ultrasonic signal reception unit" at line 13 of the amended claim. This does not provide sufficient antecedent basis for claim 12's limitation of "one or more ultrasonic signal reception unit" in line 2-3, or for claim 14's limitation of "two or more ultrasonic [signal] reception unit" in line 2, 3, 4 and 7. There is however antecedent basis for "each ultrasound signal".

**Claims 13 and 17** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites "for discriminating positions of the ultrasonic signal reception unit". The examiner does not understand how to discriminate among one item. Further at page 14, line 17 there is support for no fewer than two or more ultrasonic reception units when the units are numbered.

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct

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from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1 and 8 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 7,328,088. Although the conflicting claims are not identical, they are not patentably distinct from each other because:

While the claims in the application use a RF signal and the claim in the copending application uses an IR signal, they are obvious variants of signals that travel at the speed of light. Since the purpose of the electromagnetic signal is to start a timing period in each application, they are obvious variants of an element.

While the claims in the application have the mobile robot initiate the RF signal and the claim in the copending application is silent as to the origin of the IR signal, the difference is negligible since the speed of either an IR or RF signal is many times faster than the speed of sound. Therefore, there is imperceptible time difference between one transition from charging station to robot and two transitions of that distance.

The wording used in the remainder of the corresponding claims is an obvious variant of each other.

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-2 and 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,758,691 to De Bruyne (De Bruyne) in view of U.S. Patent No. 4,207,571 to Passey (Passey). De Bruyne teaches an apparatus for determining the position of a movable object. Passey is concerned with navigation aids.

Regarding independent **claim 1**, “A method for detecting a position of a mobile robot, the method comprising:” - “a mobile robot” in the preamble, reads on De Bruyne’s movable object, because none of the functions of a robot are used or referred to in the body of the claim. It is the fact that both the robot and movable object move that requires that a means be found to determine the object’s position.

“calculating time taken for each ultrasonic signal generated by a plurality of ultrasonic signal oscillating units of a charging station to reach the mobile robot, the ultrasound signal being generated based on a point of time at which a radio frequency (RF) signal is emitted from the mobile robot; and” - reads on De Bruyne col. 2, lines 64-68 where the method successively measures the traveling times of ultrasonic pulses from two transmitters on a base station to the ultrasound receiver on the moving object. The measurement is from a the time of a transmission of pulses in the region of visible

or invisible light to indicate the start of the ultrasonic transmissions, col. 2, lines 4-10.

The examiner takes official notice that both RF frequencies and visible and invisible light frequencies travel at the same speed and are hence equivalent in this application.

“calculating a distance between the charging station and the mobile robot based on the calculated reaching time; and” - reads on De Bruyne col.3, lines 18-23 where the distances  $d_1$  and  $d_2$  are determined.

“calculating an angle between the charging station and the mobile robot based on the calculated distance value and a preset distance value between the plurality of ultrasonic signal oscillating units,” - Reads on De Bruyne col.3, lines 18-42 where the known distance  $D$  between the transmitters is used in conjunction with the values  $d_1$  and  $d_2$  to calculate the x and y coordinates. The angle can be calculated as easily as the coordinates.

“wherein the RF signal is emitted at preset time intervals such that the ultrasound signal is generated at the preset time intervals.” – This limitation does not read on De Bruyne, because in De Bruyne the moving object sends an IR signal when it wishes to determine a position, rather than at regular intervals. The limitation does read on Passey, col.2 lines 27-29, which uses RF signals that are sent at regular intervals to allow measuring the distance at regular times. Further, while Passey uses RF signals, it teaches that one can use IR, UV and visible light in place of RF, Col. 1, lines 18-23. It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute a known RF transmitting/receiving element excited at regular intervals for the infrared transmitting/receiving element transmitting intermittently to obtain the



predictable result of a signal transmitted at the speed of light that allows measurement of the distance at any time.

Regarding **claim 2**, “The method of claim 1, wherein the angle between the charging station and the mobile robot is calculated through triangulation based on the calculated distance value and the preset distance value between the plurality of ultrasonic signal oscillating units.” - Reads on De Bruyne col. 3, lines 18-24, where the distances  $d_1$  and  $d_2$  to the moving object are determined and the distance  $D$  between the two ultrasonic oscillating means is known. The examiner takes official notice that triangulation is a technique well known those in the engineering sciences. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the known technique of triangulation in De Bruyne to determine the angle between the moving object and the base station.

Regarding **claim 5**, “The method of claim 1, further comprising adding a semidiameter of the mobile robot to the distance value between the charging station and the mobile robot.” - does not read on De Bruyne because De Bruyne places the ultrasonic transducer at the point of measurement. When applicant adds a semidiameter to the distances calculated they are producing a reading from a single point. The application does however, read on Passey which places the ultrasonic receivers outboard of the center of the target. At col. 2, lines 55-57, Passey notes that the range readings calculated based on the ultrasonic receivers displaced from a

centerline can be integrated, by well known methods, to produce a single range reading. It would have been obvious to one of ordinary skill in the art at the time of the invention to apply the known technique correcting for the displacement of the measurement point to De Bruyne's device if the ultrasonic receiver were on placed atop the target.

Regarding **claim 6**, "The method of claim 1, wherein the distance value between the charging station and the mobile robot is detected through expression  $S=340[m/sec] \times (T1-T2)$ , wherein 340[m/sec] is sound velocity, T1 is time taken to receive an ultrasonic signal, and T2 is time taken to oscillate an ultrasonic signal after receiving an RF signal." – This limitation is implied by De Bruyne at col. 3, lines 18-21 where the counters are started at the time the ultrasonic transmitter oscillates and therefore T1-T2 is accomplished. Further, claim 6 reads on Passey where the electromagnetic signal and the sonic signals are transmitted simultaneously, so that T2= 0, col. 1, lines 16-18 and col. 2, lines 14-17. Passey teaches that the conversion of time periods into distance depends on the local speed of sound, col. 3, lines 14-15, which encompasses the claim's use of 340 m/sec as the speed of sound.

***Allowable Subject Matter***

**Claims 8 and 16-18** would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

**Claims 4 and 12-14** would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the rewritten or amended base claim and any intervening claims.

**Claims 9-11 and 15** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the rewritten or amended base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Relative to claim 8, the cited prior art does not suggest or teach a control unit configured to control the ultrasonic signal oscillating units so that the ultrasonic signals are oscillated whenever the RF signal is received by the RF reception unit. Relative to claims 16 and 17, the cited prior art does not suggest or teach the use of multiple ultrasonic receiving means identified by a prestored position number used in order to detect the direction in which the robot is proceeding. Relative to claim 18, the cited prior art does not suggest or teach using the two fastest reaching time values to determine the distance between the mobile robot and the charging station.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent No. 4,813,025 to Rowland et al.; U.S. Patent No. 6,327,219 to Zhang et al. and U.S. Patent Pub. No. 2002/0031050.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LIN B. OLSEN whose telephone number is (571)272-9754. The examiner can normally be reached on Mon - Fri, 8:30 -5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas G. Black can be reached on 571-272-6956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/L. B. O./  
Examiner, Art Unit 3661

/Thomas G. Black/  
Supervisory Patent Examiner, Art Unit 3661